



Data Sheet and Service Manual

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Product Information

Brand	De'Longhi
Models	Magnifica Duo ECAM330.80
Versions	INT, US/CA



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Document

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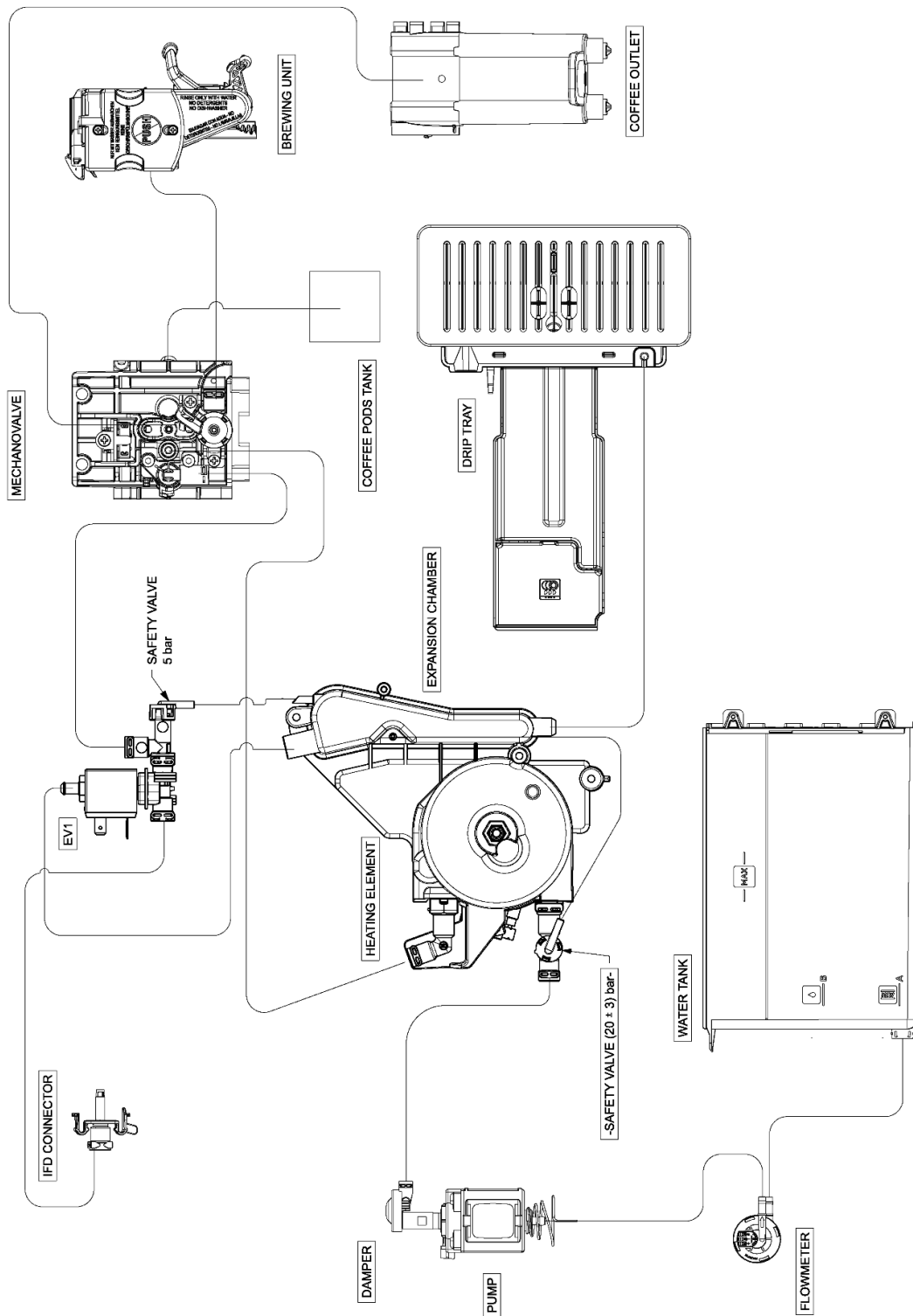
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Technical Data

GENERAL INFORMATION	
Voltage - Frequency - Input Power	220-240V ÷ 50-50Hz ÷ 1450W (INT version) 120V ÷ 60Hz ÷ 1450W (US/CA version)
Stand-by Button OFF	≈ 0.25Wh
COMPONENTS	
Pump	220-240Vac ÷ 48W ÷ 15Bar (INT version) 120Vac ÷ 52W ÷ 15Bar (US/CA version)
Solenoid Valve (EV1)	220-240Vac (INT version) 120Vac (US/CA version)
Grinder Motor	220-240Vac (INT version) 120Vac (US/CA version)
Transmission Motor	DC with position encoder
THERMOBLOCK	
Temperature probe	NTC sensor
Thermal Fuse TCO	192°C
Heating Element	230Vac ÷ 1400W (INT version) 120Vac ÷ 1400W (US/CA version)

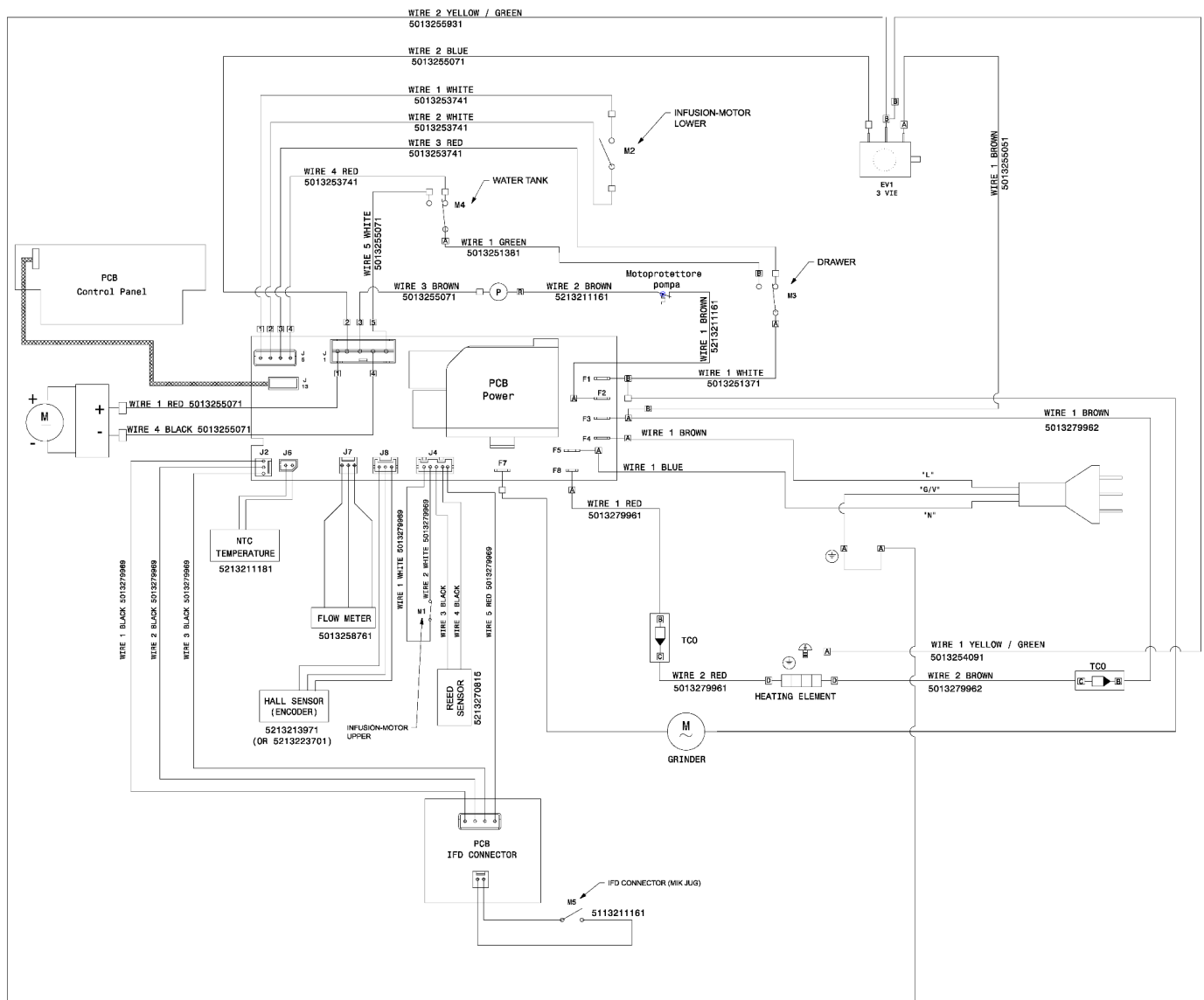
Hydraulic Diagram



Wiring Diagrams

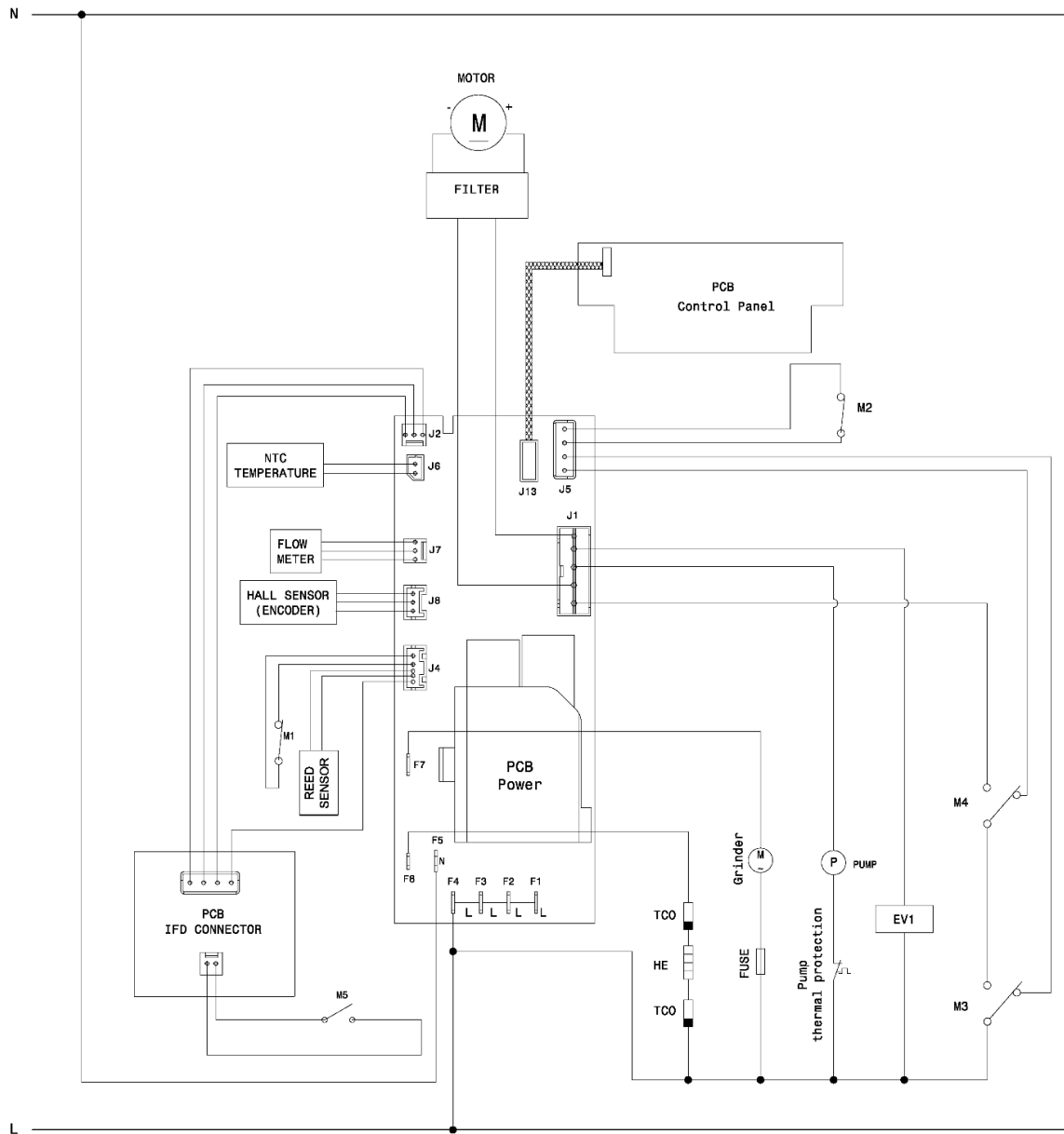
Practical Outline (INT Version)

PRACTICAL OUTLINE



Theoretical Outline (INT Version)

THEORETICAL OUTLINE

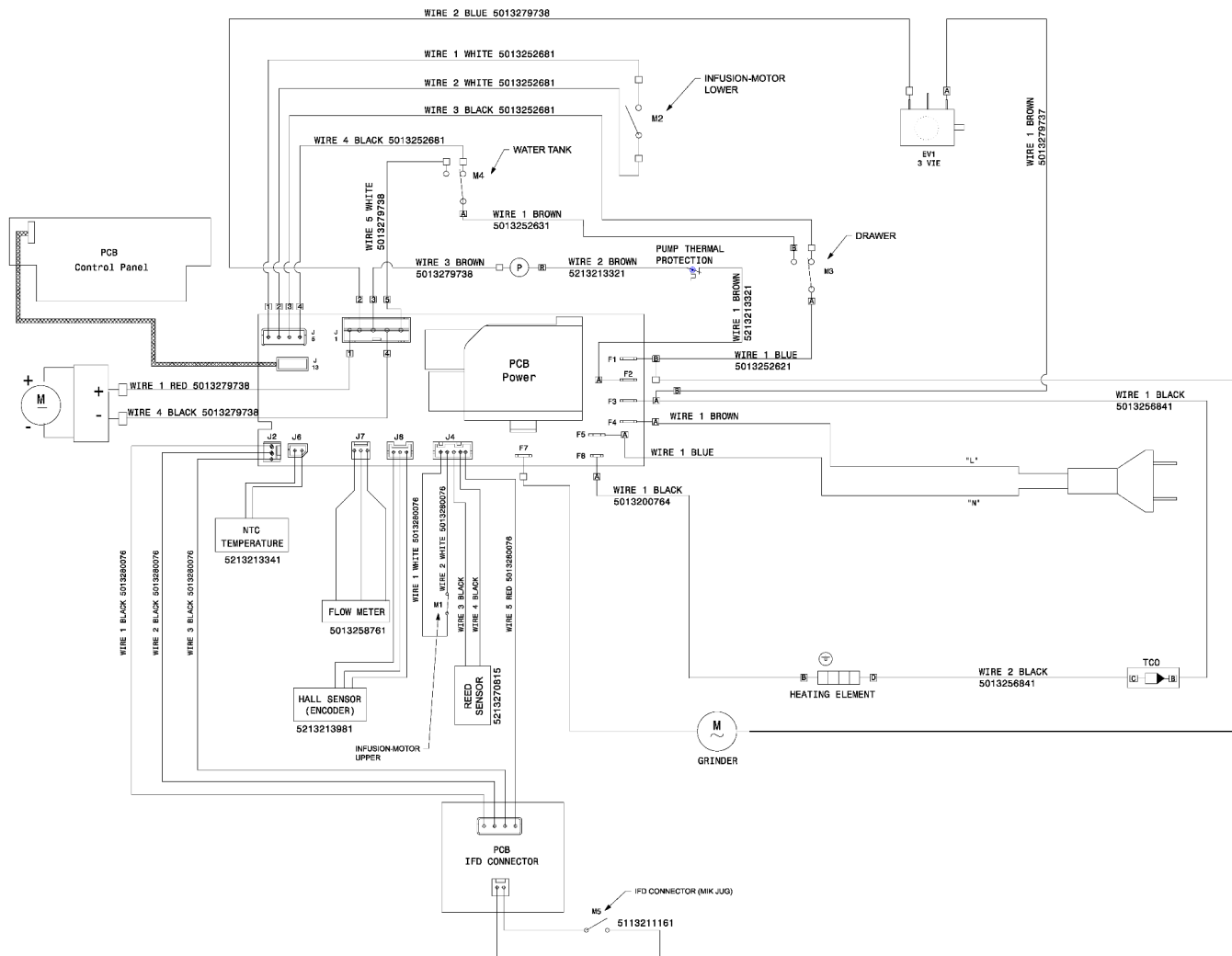


LEGEND:

L : PHASE/LINE
 N : NEUTRAL
 TCO : THERMAL CUT OFF/THERMAL LINK
 HE : HEATING ELEMENT
 M1 : MICROSWITCH UPPER (GROUP INFUSION-MOTOR)
 M2 : MICROSWITCH LOWER (GROUP INFUSION-MOTOR)
 M3 : MICROSWITCH DRAWER
 M4 : MICROSWITCH WATER TANK
 M5 : MICROSWITCH IFD CONNECTOR (MILK JUG)

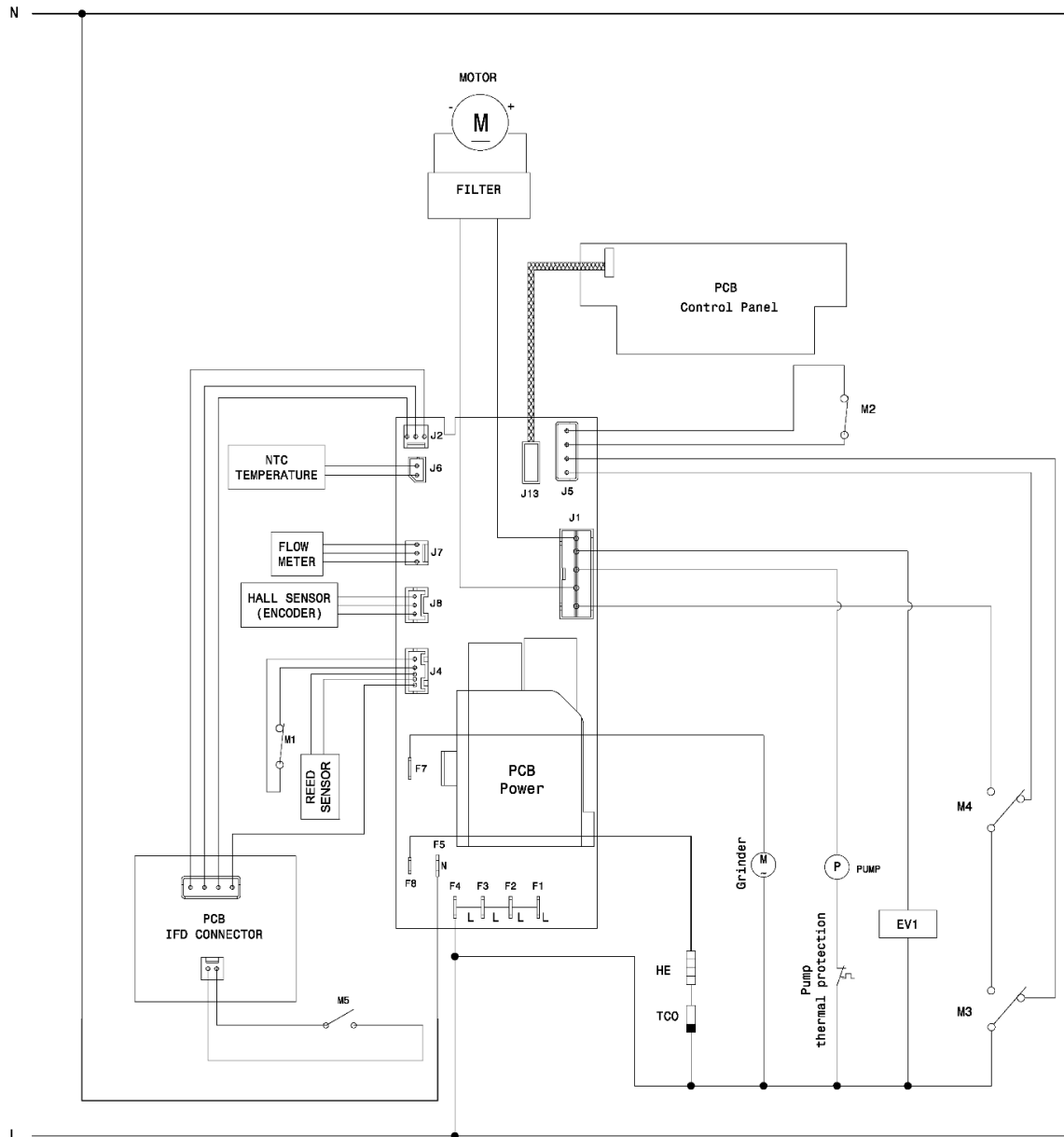
Practical Outline (US/CA Version)

PRACTICAL OUTLINE



Theoretical Outline (US/CA Version)

THEORETICAL OUTLINE



LEGEND:

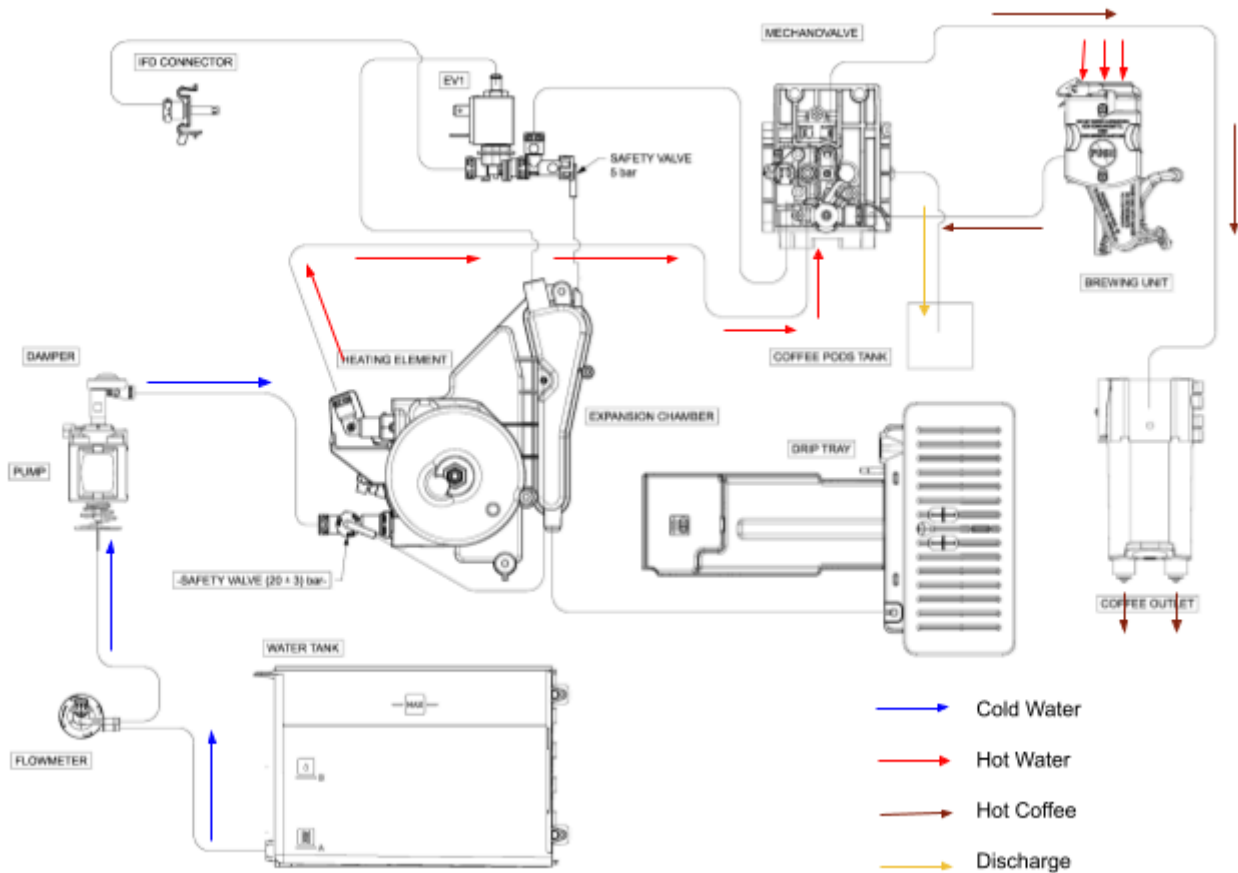
L : PHASE/LINE
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 M4 : MICROSWITCH WATER TANK
 M5 : MICROSWITCH IFD CONNECTOR (MILK JUG)

Working Principle

Micro-Switches, Sensors and Solenoid Valves

Micro Switches	Function	Logic
M1 = Upper Micro Switch	Detects when the brewing unit is on top position.	“NC”, it opens when the brewing unit is in top position.
M2 = Lower Micro Switch	Detects when the brewing unit is on down position.	“NO”, it closes when the brewing unit is in down position.
M3 = Drawer Micro Switch	Detects when the drip tray is in correct position.	Change-over micro switch. When the drip tray is inserted: • The contact for the drip tray detection is OPEN; • The contact for the transmission motor power supply is CLOSED.
M4 = Water Tank Micro Switch	Detects the presence of the water tank.	Change-over micro switch. When the water tank is inserted: • The contact for the water tank detection is OPEN; • The contact for the transmission motor power supply is CLOSED.
M5 = Steam Connector Micro Switch	Detects when an accessory (hot water spout, milk jug) is attached to the machine.	“NO”, it closes when the accessory is attached.
Reed and Encoder	Function	Logic
Reed Sensor Empty Water Tank	Detects when the water level is at minimum.	
Hall Sensor Encoder	Detects the rotations of the transmission motor.	

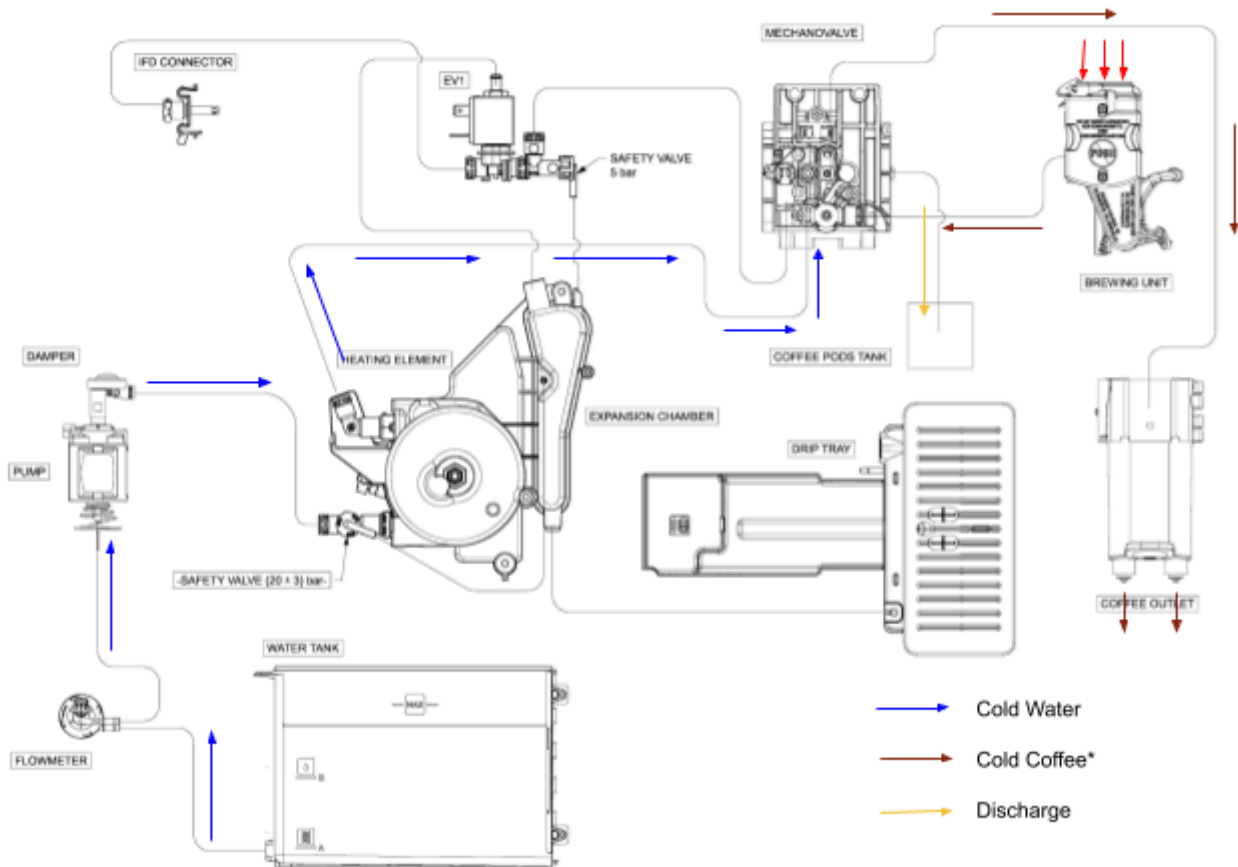
Hot Coffee Preparation



Hot Coffee Preparation Steps:

1. The Thermoblock is **activated**.
2. The Grinder is activated for a certain amount of time (based on the coffee taste selection).
3. The Brewing Unit moves to the mechanical valve.
4. The Pump is activated for a couple of seconds for pre-infusion.
5. The Pump is activated in continuous mode to deliver hot coffee.
6. The Pump stops, the Thermoblock turns OFF.
7. The Brewing Unit moves away from the mechanical valve and releases the coffee pod.
8. The Mechanical Valve discharge the excess of water/coffee to the grounds container.
9. The Brewing Unit moves back to the "Ready to Use" position.

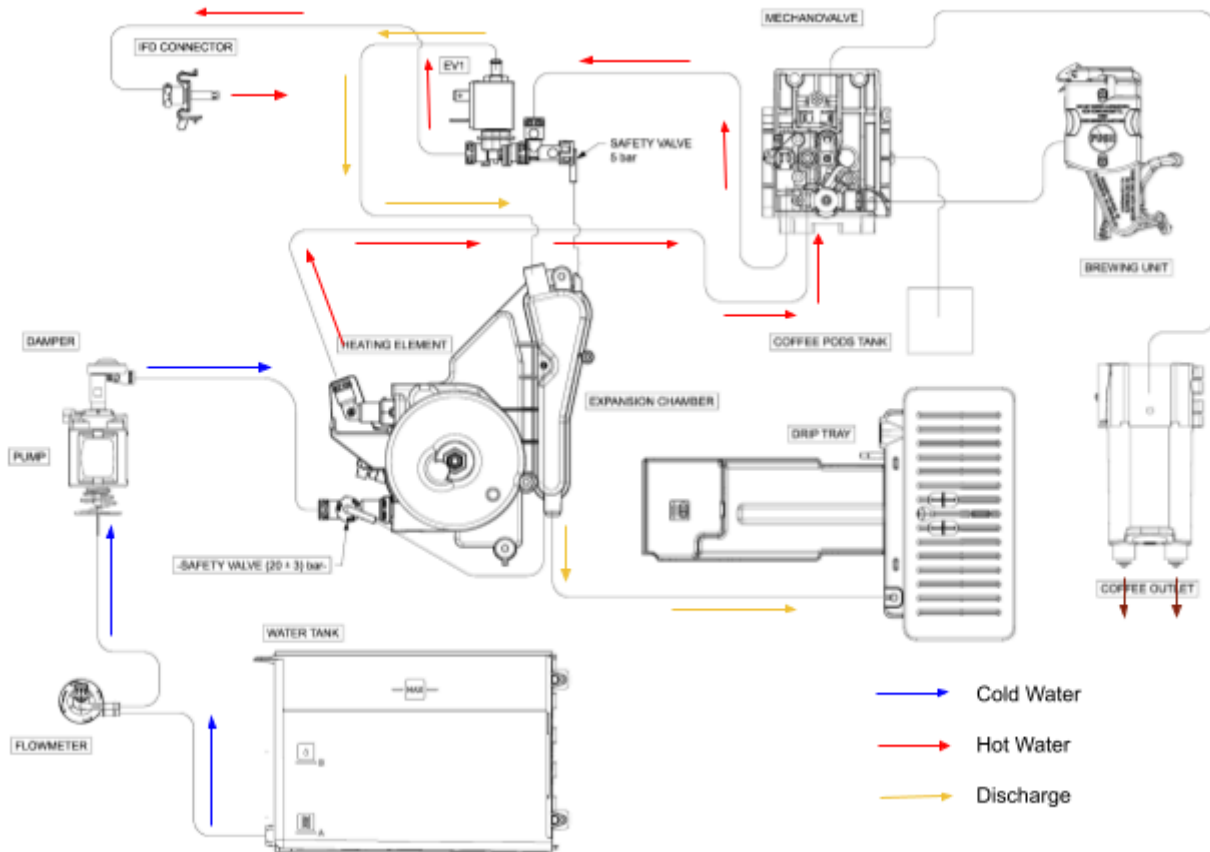
Cold Coffee Preparation



Cold Coffee Preparation Steps:

1. The Grinder is activated for a certain period of time (based on the coffee taste selection).
2. The Brewing Unit moves to the mechanical valve.
3. The Pump is activated in pulsing mode for a certain period of time to brew the coffee. During this phase the Thermoblock is OFF.
4. The Brewing Unit moves away from the mechanical valve and releases the coffee pod.
5. The Mechanical Valve discharges the excess of water/coffee to the grounds container.
6. The Brewing Unit moves back to the “Ready to Use” position.

Hot Water Preparation

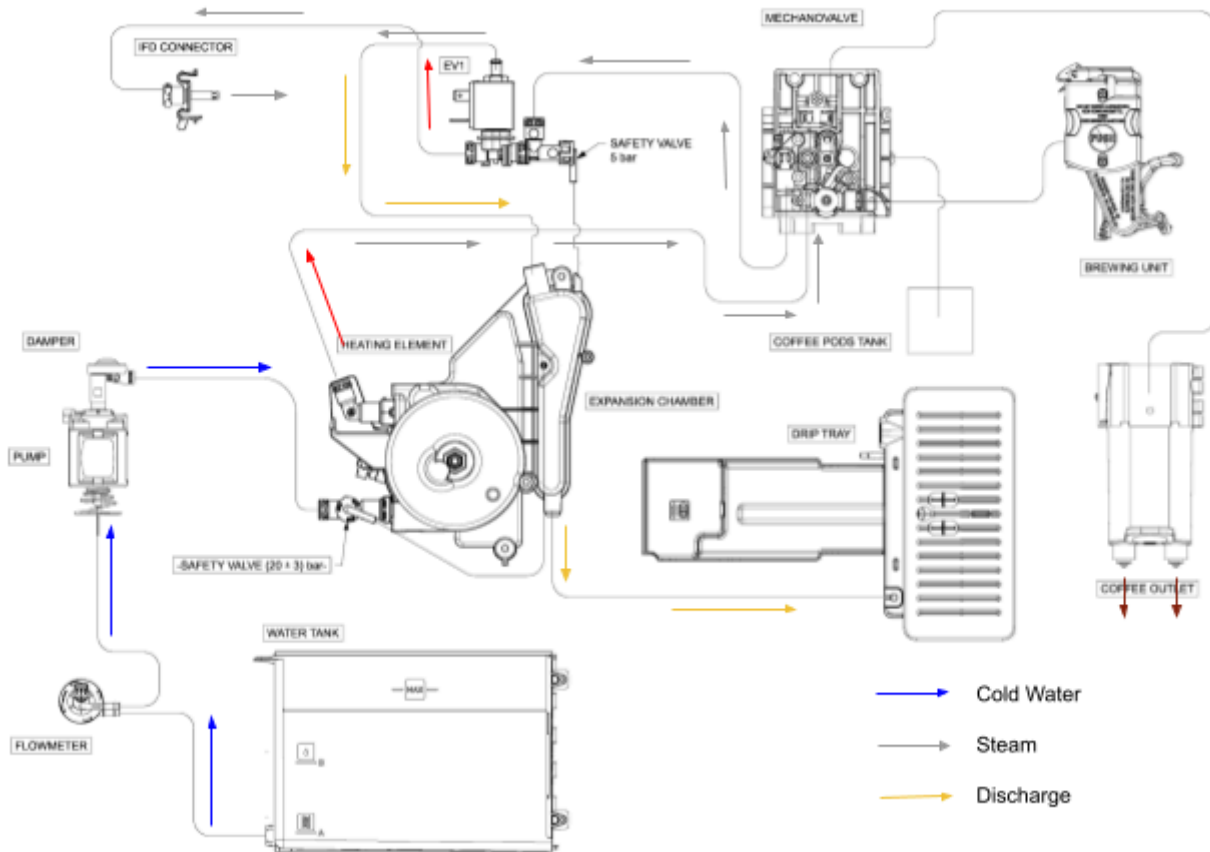


Hot Water Preparation Steps:

1. The EV1 Solenoid Valve is activated.
2. The Thermoblock is activated.
3. The Pump is activated in fast pulsing mode for a certain amount of time.
4. The hot water is delivered through the Hot Water Spout attached to the nozzle.
5. The Pump stops, the EV1 Solenoid Valve and the Thermoblock are deactivated.
6. The residual water is discharged by the EV1 Solenoid Valve into the drip tray.

IMPORTANT NOTICE: This function can be activated only if the Hot Water Spout is attached to the nozzle.

Milk Froth Preparation (for both LatteCrema Hot and LatteCrema Cool)



Milk Froth Preparation Steps:

1. The EV1 Solenoid Valve is activated.
2. The Thermoblock is activated (temperature set point above 100°C).
3. The Pump is activated in slow pulsing mode for a certain amount of time.
4. The steam is injected from the nozzle into the milk jug and mixed with the air (according to the milk froth knob position) to froth the milk.
5. The Pump stops, the EV1 Solenoid Valve and the Thermoblock are deactivated.
6. The residual steam and pressure are discharged by the EV1 Solenoid Valve into the drip tray.

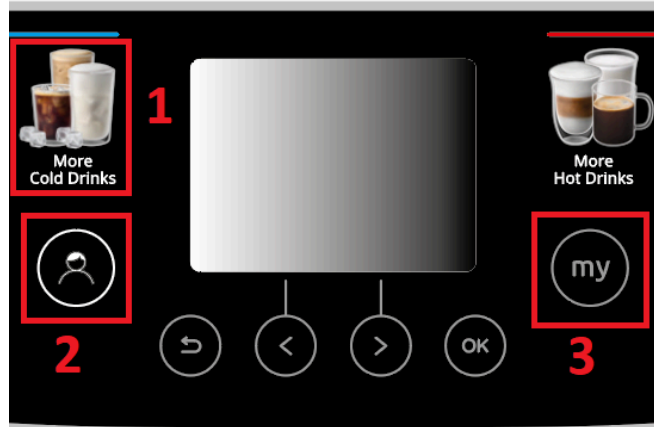
IMPORTANT NOTICE: This function can be activated only if one of the Milk Jugs (LatteCrema Hot or LatteCrema Cool) is attached to the nozzle.

Test Mode

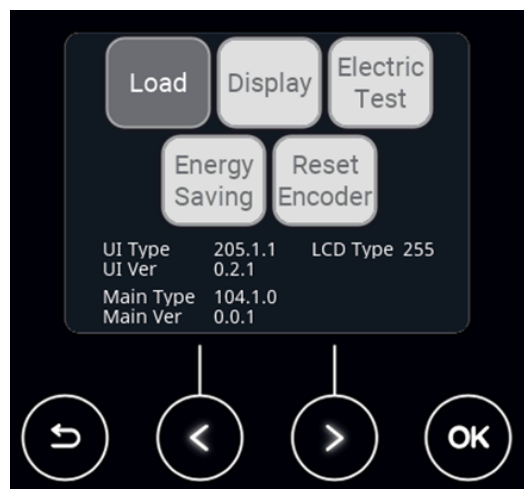
Access to the Test Modes

To activate the **Test Modes**, proceed as follows:

1. The appliance must be plugged in and in stand-by mode.
2. Remove the **water tank**.
3. When the request to insert the water tank prompts on the display, press in sequence the buttons shown in the image below:

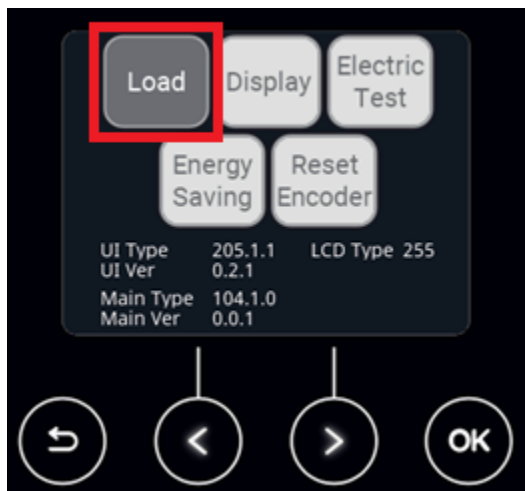


4. Insert the **water tank**.
5. Select the desired test mode from the next page that appears on the display:



Load Test Mode

After having accessed the test modes as previously explained, select the **LOAD** option with the **OK** button to access the **Load Test Mode**:

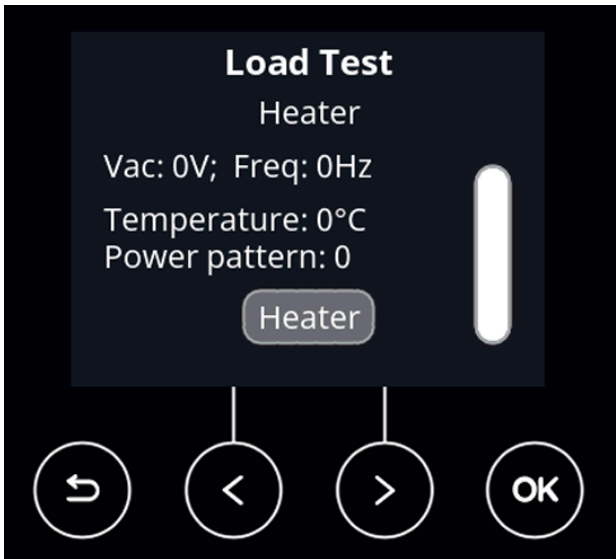


Move then across the **Load Test Mode** functions by using the **LEFT** and **RIGHT** arrow buttons.

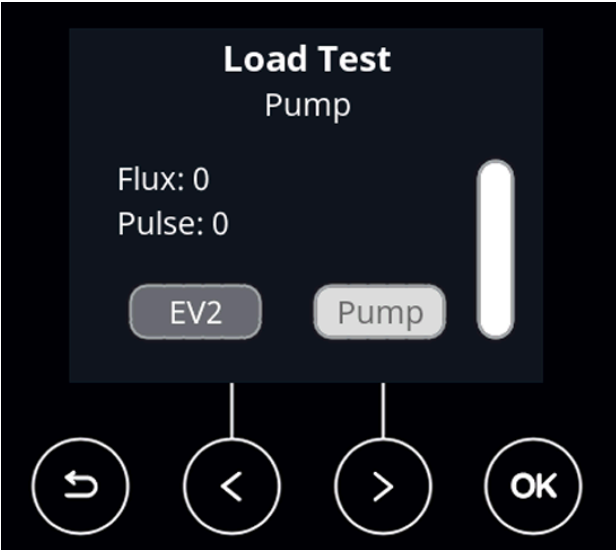
BREWING UNIT

A screenshot of the 'Load Test' screen, specifically the 'Brewing unit' section. The screen displays 'Motor Pos 0' next to a vertical bar. There are three buttons on the left: 'Extract', 'Up', and 'Down'. There is a 'Grinder' button on the right. At the bottom, there are four circular buttons with symbols: a left arrow, a right arrow, a double left arrow, and an 'OK' button.	BUTTONS Extract: Moves the brewing unit to the extract position. Up: Moves the brewing unit towards the mechanical valve. Down: Moves the brewing unit towards the 0 position. Grinder: Activates the grinder for 4 seconds. INFORMATION Motor Pos: Indicates the encoder value coming from the Hall sensor.
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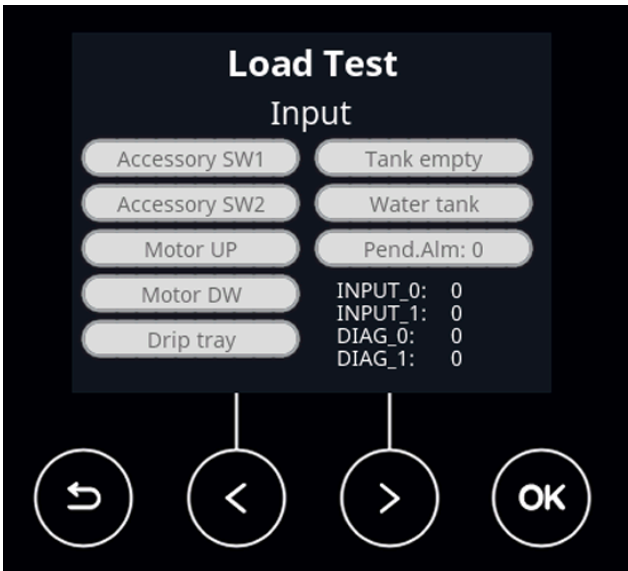
HEATER

	BUTTONS Heater: Activates the Thermoblock for 5 seconds. INFORMATION Vac: Indicates the mains voltage. Freq: Indicates the mains frequency. Temperature: Indicates the temperature measured by the NTC sensor of the Thermoblock. Power Pattern: Indicates the absorbed power from 0 to 10.
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PUMP

	BUTTONS EV2: Activates the solenoid valve. Pump: Activates the pump for about 200 pulses of the flowmeter. INFORMATION Flux: Indicates the water flow in dg/sec. Pulse: Indicates the pulses counted by the flowmeter (after one activation of the pump, the value is about 200 ÷ 210 pulses).
--	--

INPUT



INFORMATION

Accessory SW1 and Accessory SW2: Indicate the status of the **accessories** presence:

- **Accessory SW1 ON:** the **Hot Water Spout** is inserted;
- **Accessory SW1 + Accessory SW2 ON:** the **LatteCrema Hot** milk jug is inserted;
- **Accessory SW2 ON:** the **LatteCrema Cool** milk jug is inserted.

Motor UP: Indicates the status of the **Upper Micro Switch**.

Motor DOWN: Indicates the status of the **Lower Micro Switch**.

Drip Tray: Indicates the status of the **Drip Tray Presence Micro Switch**.

Tank Empty: Indicates the status of the **Empty Water Tank Reed Switch**.

Water Tank: Indicates the status of the **Water Tank Presence Micro Switch**.

Pend Alm: Indicates the **last Pending Alarm** occurred (see the table in the next paragraph).

Pending Alarms (PEND ALM)

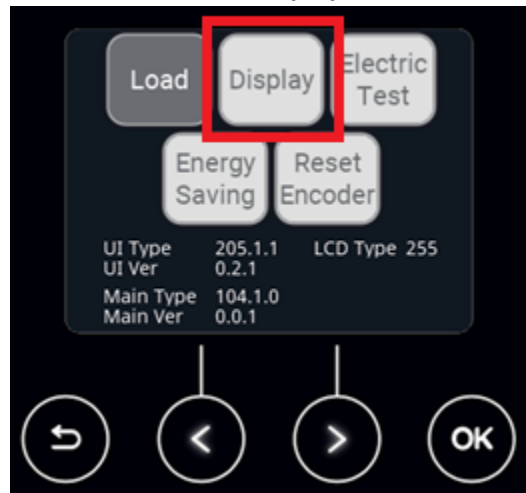
PEND ALM means **Pending Alarms**. It shows a code for the General Alarm possible causes according to the table below:

Load	Code	Issue
Motor	1	The upper micro switch is defective or the Hall sensor does not detect the motor movement.
	2	The lower micro switch is defective or the Hall sensor does not detect the motor movement.
	5, 6, 7	The motor movement is too slow or the Hall sensor does not detect the motor movement.
	8	The upper micro switch is pushed and the motor movement is too slow or the Hall Sensor does not detect the motor movement.
	11	Both the upper and lower micro switches are pushed.
	12	The Hall sensor does not detect the motor movement.

Load	Code	Issue
Thermoblock	41	The NTC of the Thermoblock is faulty (open circuit or shortcut).
	42	The TCOs of the Thermoblock are faulty or the Thermoblock won't heat.

Display Test Mode

After having accessed the test modes as previously explained, select the **DISPLAY** option by moving with the arrow buttons and confirming with the **OK** button to access the **Display Test Mode**:



The appliance will show the following prompt on the display:



During the **Display Test Mode**, all the LEDs are OFF. When a button is pushed, a beep is emitted to confirm that the input has been received.

IMPORTANT NOTICE: Once the **Display Test Mode** has been performed in the appliance, the machine is set back to “**first usage**”, therefore it will ask again for:

- the first hydraulic circuit filling;
- the language selection;
- the water softener filter installation.

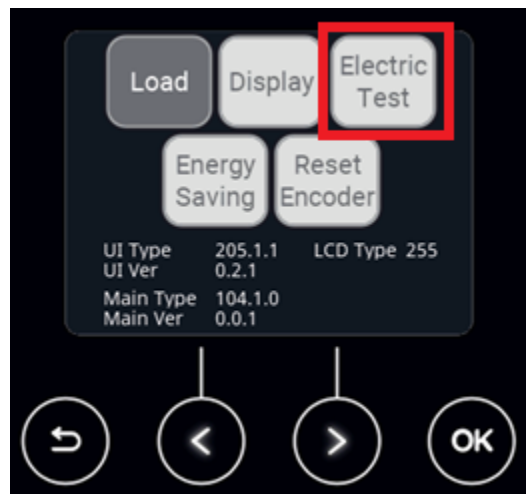
IMPORTANT NOTICE: In case the machine is reset to “first usage” through the **Display Test Mode** or by replacing the main power PCB, it is recommended to provide the user with a new **Total Hardness Test Indicator Paper** (P/N 5532110300):



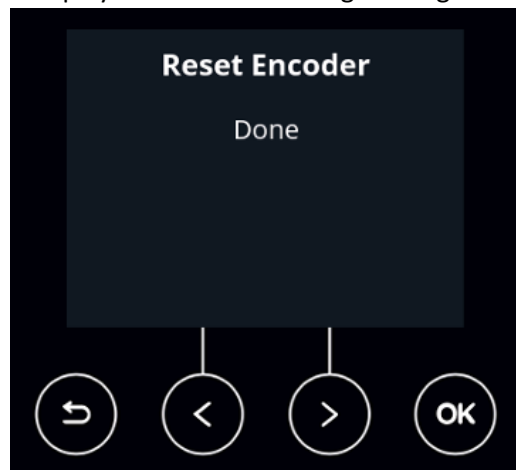
Thanks to this item, the customer has the opportunity to properly set the appliance according to the real water hardness in use with the coffee machine.

Reset Encoder

After having accessed the test modes as previously explained, select the **RESET ENCODER** option by moving with the arrow buttons and confirming with the **OK** button to access the **Encoder Reset** function:



By choosing this option, the machine's display shows the following message to confirm the success of the operation:



Appliance Diagnostics

Tests Executions from the Load Test Mode

Coffee Circuit Flow Activation

To check the operation of the coffee circuit, proceed as follows:

1. Move the brewing unit to the top limit position (i.e. to the mechanical valve);
2. Activate the pump.

The water flows through the flowmeter, the Thermoblock, the mechanical valve, the brewing unit and comes out from the coffee spouts.

Hot Water and Steam Flow Activation

To check the operation of the hot water and steam circuit, proceed as follows:

1. The brewing unit must not be in the top limit position (i.e. to the mechanical valve);
2. Activate the solenoid valve.
3. Activate the pump.

The water flows through the flowmeter, the Thermoblock, the mechanical valve's by-pass and the solenoid valve. Finally, the hot water comes out from the Hot Water Spout attached to the nozzle.

IMPORTANT NOTICE: The **Hot Water Spout** accessory must be attached to the coffee machine to allow the manual activation of the solenoid valve.

Electrical Checks Directly on the Components

Heating Element Resistance Check

Thermoblock resistance value:

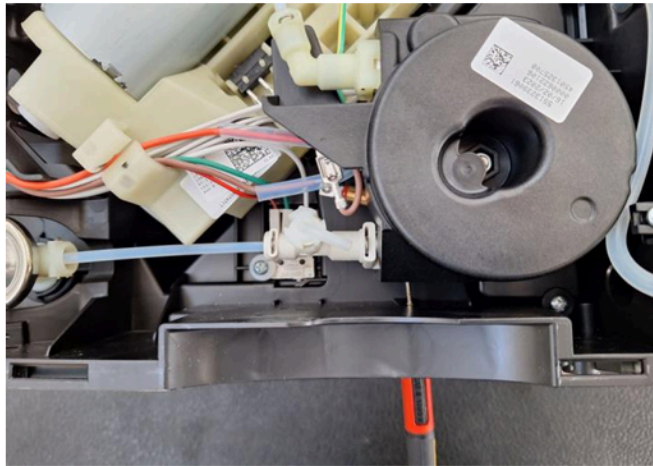
- ≈ 35 Ohms (INT version);
- ≈ 11 Ohms (US/CA version).

Resistance/Temperature Characteristics for the NTC Sensor

TEMP. °C	MINIMUM k Ω	NOMINAL k Ω	MAXIMUM k Ω	Temp. Accy °C	Resi.Accy %
0,0	310,0	328,9	348,8	$\pm 1,17$	$\pm 6,05$
20,0	118,6	124,6	130,9	$\pm 1,10$	$\pm 5,00$
40,0	50,75	52,85	55,02	$\pm 1,01$	$\pm 4,10$
60,0	23,82	24,61	25,43	$\pm 0,92$	$\pm 3,31$
80,0	12,09	12,41	12,73	$\pm 0,81$	$\pm 2,62$
100,0	6,557	6,691	6,825	$\pm 0,60$	$\pm 2,00$
120,0	3,664	3,759	3,855	$\pm 0,94$	$\pm 2,55$
140,0	2,161	2,228	2,296	$\pm 1,22$	$\pm 3,06$
160,0	1,327	1,375	1,423	$\pm 1,51$	$\pm 3,51$
180,0	0,8445	0,8781	0,9126	$\pm 1,82$	$\pm 3,93$
200,0	0,5541	0,5783	0,6033	$\pm 2,14$	$\pm 4,32$

Ground Check Point for the Appliance (Only for INT Version)

In order to check the main ground connection of the appliance, insert the ground tester probe from the round hole located under the basement of the appliance on the Thermoblock's side until it will touch the Thermoblock's metal surface, as displayed in the picture below:



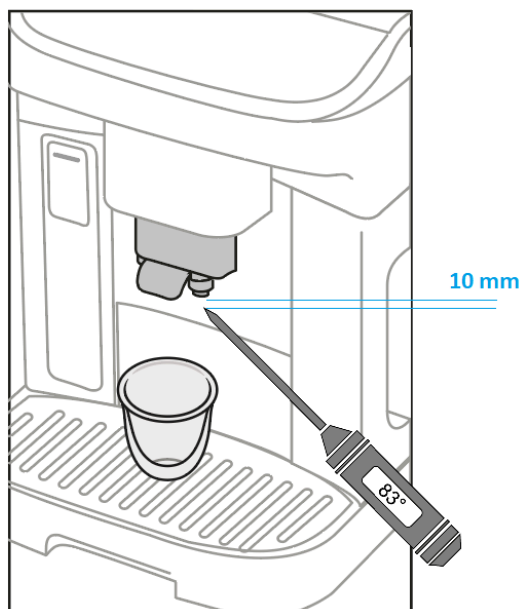
Hot Coffee Temperature Test

Complaints from end users about coffee temperature are quite frequent. They are mainly due to incorrect appliance adjustments or to an incorrect expectation by the customer.

A **hot coffee temperature measurement** is required all the times any of these complaints are encountered.

To perform the hot coffee temperature test, follow in sequence the steps below:

1. Turn the appliance ON.
2. Set the medium temperature profile, as explained in the user manual.
3. Run 1-2 rinse cycles to warm up the hydraulic circuit.
4. Select to prepare a **DOUBLE SHOT ESPRESSO COFFEE** (refer to the user manual for more details).
5. Start the coffee preparation.
6. Wait until at least 20 ml of coffee have been delivered into the cup.
7. Measure the coffee flow temperature at about $2 \div 10$ mm from the coffee spout, as shown in the picture below:



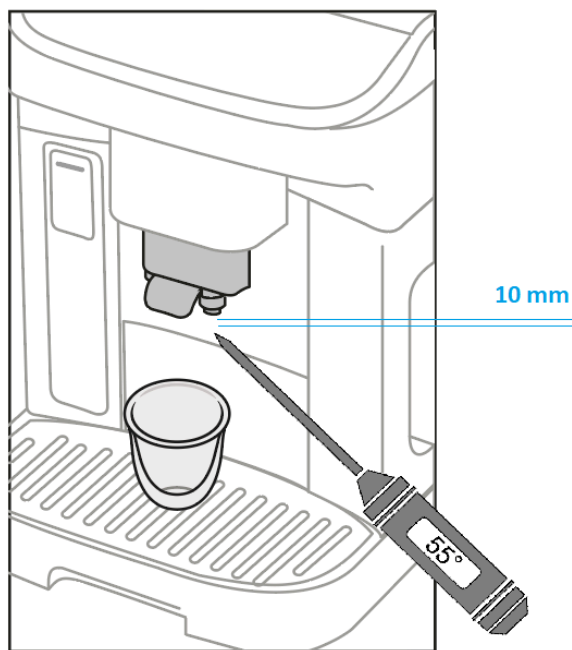
The **optimal indicative temperature measurement** should be $83^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for the medium temperature profile set in the machine.

Cold Brew Coffee Temperature Test

As the machine is using the same circuit for both the hot and the cold coffee drinks preparations, the Cold Brew coffee is not delivered with ambient temperature water, but **by keeping the Thermoblock OFF starting from an initial set point of at least 75°C**, which makes the coffee brewed to be warm. The “Cold Brew” effect is then achieved when the coffee gets in touch with the ice cubes that must be added to the cup before the preparation.

To make sure that the cold brew preparation is satisfying the temperature specifications, proceed with the test described in the steps below:

1. Turn the appliance ON.
2. Set the medium temperature profile, as explained in the user manual.
3. Select to prepare a **COLD BREW DRINK** (refer to the user manual for more details).
4. Add **6 ice cubes** (prepared with the ice cube tray with spare part number **5313281401**) to the glass in which the cold brew drink is being delivered.
5. Start the coffee preparation.
6. Wait until at least 20 ml of coffee have been delivered into the cup.
7. Measure the coffee flow temperature at about $2 \div 10$ mm from the coffee spout, as shown in the picture below:



The **optimal indicative temperature measurement** is about $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$ at the beginning of the brewing process, and then it slowly decreases up to $40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ as the Thermoblock is OFF during the brewing process.

At the end of the cold brew drink preparation, measure the temperature in the glass:



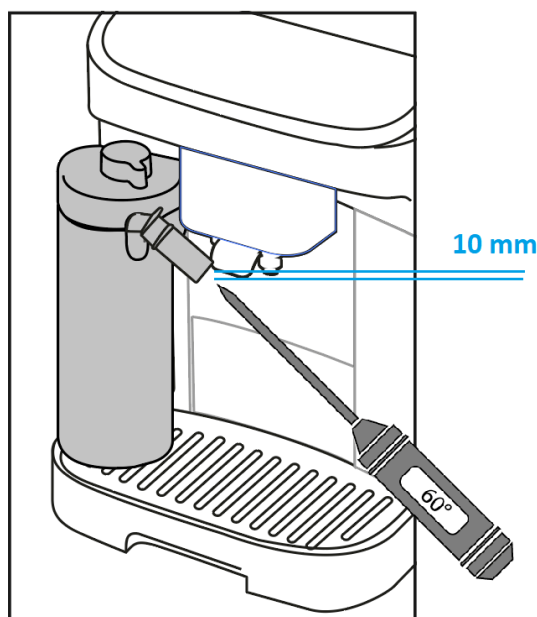
The **optimal indicative temperature measurement in the glass (with 6 ice cubes)** after about 10 seconds should be **12°C ± 3°C**.

Hot Frothed Milk Consistency and Temperature Test

A hot frothed milk consistency and temperature test can be required when the Service Engineer is receiving complaints from the end user about the quality or the temperature of the hot milk drinks.

To perform the **hot frothed milk consistency and temperature test**, follow in sequence the steps below:

1. Turn the appliance ON.
2. Fill the milk jug with 200ml of semi-skimmed milk at a temperature of $5^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
3. Insert the lid to the jug and connect it to the appliance.
4. Set the maximum level of froth by rotating the frothing adjustment knob on the jug lid accordingly.
5. Place a 250ml PIREX graduated container under the milk spout.
6. Select the **HOT MILK DRINK** and wait until at least 80ml of frothed milk have been delivered into the container.
7. Measure the milk flow temperature during the delivery at about $2 \div 10$ mm from the spout, as shown in the picture below:



The **optimal conditions for the hot frothed milk** (without coffee) should be as resumed below:

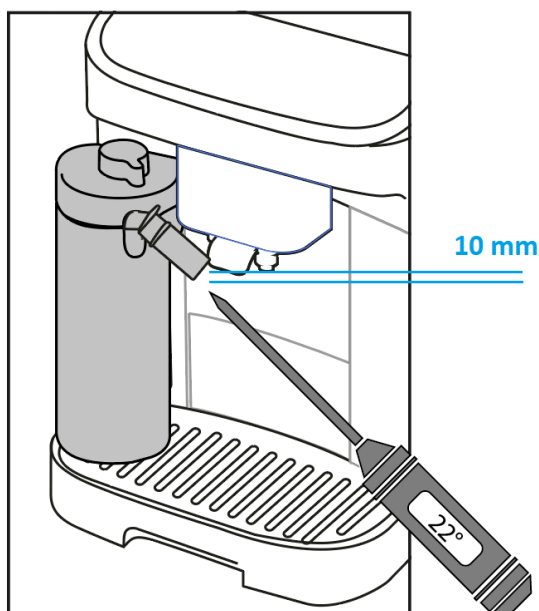
- **Frothed Appearance:** small bubbles without splashes.
- **Milk Temperature:** $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
- **Froth Amount:** 50% milk and 50% froth.

Cold Frothed Milk Consistency and Temperature Test

A cold frothed milk consistency and temperature test can be required when the Service Engineer is receiving complaints from the end user about the quality or the temperature of the cold milk drinks.

To perform a **cold frothed milk consistency and temperature test**, follow in sequence the steps below:

1. Turn the appliance ON.
2. Fill the milk jug with 200ml of skimmed milk at a temperature of $5^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
3. Insert the lid to the jug and connect it to the appliance.
4. Set the maximum level of froth by rotating the frothing adjustment knob on the jug lid accordingly.
5. Place a 250ml PIREX graduated container under the milk spout.
6. Select the **COLD MILK DRINK** and wait until at least 80ml of frothed milk have been delivered into the container.
7. Measure the milk flow temperature during the delivery at about $2 \div 10$ mm from the spout, as shown in the picture below:



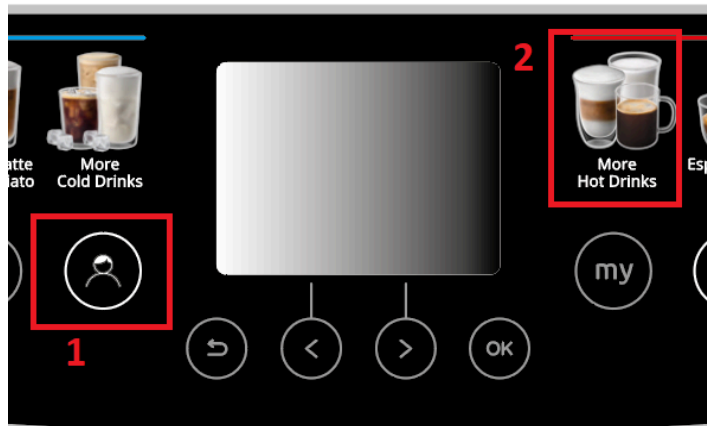
The **optimal conditions for the cold frothed milk** (without coffee) should be as resumed below:

- **Frothed Appearance:** small bubbles without splashes.
- **Milk Temperature:** $23,5^{\circ}\text{C} \pm 2,5^{\circ}\text{C}$.
- **Froth Amount:** 50% milk and 50% froth.

Demo Mode Activation

The procedure below explains how to start the continuous displaying of the demonstration video on the Magnifica Duo screen, for instance in case the appliance would be exhibited on a shelf of a shop.

1. Make sure the machine is plugged to the power socket and in **stand-by** mode.
2. Remove the **drip tray**.
3. When the request to insert the drip tray prompts on the display, press in sequence the buttons shown in the image:



4. Insert the **drip tray**.

The demonstration video will start being displayed continuously on the screen until the appliance will be unplugged from the socket.